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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,563	11/27/2001	Yong Sung Ham	049128-5045	7444

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MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004

EXAMINER

LEFLORE, LAUREL E

ART UNIT	PAPER NUMBER
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2673

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/993,563

Applicant(s)

HAM, YONG SUNG

Examiner

Laurel E LeFlore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee 2001/0038372 A1.

3. In regard to claim 1, Lee discloses a method of driving a liquid crystal display, comprising: dividing input data into most significant bit data and least significant bit data; delaying the most significant bit data for one frame period. In paragraph [0078], Lee discloses that the data gray signal modifier (see figure 8, element 400 and figure 9) “receives n-bit data gray signals...and outputs m-bit modified data gray signals...after considering the m-bit data gray signals of the present and previous frames.” The m-bit data is the most significant bit data, as disclosed in paragraph [0122]. Here, Lee uses an 8 bit example, in which six most significant bits are modified, while the least significant bits remain unmodified. Hence, the least significant bits have been divided out before the delaying of the most significant bit data. Lee further discloses in paragraph [0097] that the data gray signal converter “generates the modified gray signals Gn’ by considering the m bits of the present and previous frames”. Hence, the

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most significant bit data is modulated in accordance with a difference between the delayed most significant bit data and the current most significant bit data.

Lee further discloses that maximum gray level values of the modulated most significant bit data include values greater than maximum gray level values of the delayed most significant bit data and the current most significant bit data. See paragraph [0102], disclosing, "The data gray signal converter 480 receives 6-bit R gray signals of the present frame and 6-bit R gray signals of the previous frame, generates modified gray signals considering the 6-bit R gray signals of the previous and present frames, adds the generated 6-bit gray signals and the 2-bit LSB gray signals of the present frame, and outputs finally modified 8-bit gray signal Gn'." Thus, 8 bits of modulated most significant bit data has values greater than 6 bits of delayed most significant bit data and 6 bits of current most significant bit data.

4. Regarding claims 2 and 6, Lee discloses an embodiment in which each most significant bit data and each least significant bit data are 4 bits. Lee discloses in paragraph [0134] an embodiment in which 4 bits are modified. Hence, the most significant bit data is 4 bits, as the most significant bit data is the data being modified (see claim 1 rejection). The input data for this case is still 8 bits, so the least significant bit data must also be 4 bits. Also, the modulated data is 8 bits, as indicated by figure 9. Gn enters element 400, the data gray signal converter, and Gn' leaves it. Here, "n" is the number of bits, in this case 8. Hence the modulated data has the same number of bits as the input data, in this case 8. Also, in paragraph [0102], Lee describes the

method of adding the least significant bits onto the most significant bit modulated data to output finally a modified 8-bit gray signal.

5. In regard to claim 3, Lee discloses a method that attaches the least significant bit data of a current frame to the modulated data. Again see paragraph [0102], in which Lee “adds the generated (modified) 6-bit gray signals and the 2-bit LSB (least significant bit) gray signals of the present frame.”

6. In regard to claim 4, Lee discloses a method, wherein the modulating of the most significant bit data comprises comparing the current most significant bit data with the one frame period delayed most significant bit data. See paragraph [0097], which describes the data gray signal converter that “generates the modified gray signals...by considering the m bits of the present and previous frames.” Here, the m bits are the most significant bit data (see claim 1 rejection). Paragraph [0096] discloses that the previous frames are delayed for one frame period, stating, “The frame memory receives m bits...from the data gray signal source, stores the same...and outputs the same...after a single frame delay.”

7. In regard to claims 4 and 7, the modulating of the most significant bit data further comprises selecting desirable data from a look-up table based on the compared data and outputting the selected data corresponding to the current most significant bit data. See paragraph [0086], which discloses a lookup table and that “the gray signals can be modified by accessing the lookup table.” Also see figure 10, which depicts a lookup table, and figure 14, element 462, which is a lookup table. It is previously established (see rejection of claim 1) that only the most significant bit data is modified.

8. In regard to claim 5, Lee discloses a driving apparatus for a liquid crystal display, comprising: a memory receiving most significant bits of an n .sup.th frame from an input line and outputting the most significant bits of an $(n-1)$.sup.th frame; and a modulator modulating the most significant bits of an n .sup.th frame in accordance to a difference between the most significant bits of the $(n-1)$.sup.th frame and the n .sup.th frame. See the previous rejection of claim 1 and paragraph [0096], which discloses a memory that receives the most significant bits of a current frame and outputs the most significant bits after a single frame delay.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee 2002/0038372 in view of Okuzono et al. 2001/0043178.

11. In regard to claim 8, Lee discloses a liquid crystal display panel having a plurality of data lines to which data are supplied and a plurality of gate lines to which scanning signals are supplied. See paragraph [0009], lines 8-11, which disclose an "LCD panel comprising a plurality of gate lines for transmitting the scanning signals" and "a plurality of data lines...for transmitting the image signals". Here, it is understood that the image signals constitute supplied data. A gate driver supplies the scanning signals to the gate lines, as depicted in element 200 of figure 8. Lee further discloses a data driver

receiving modulated video data from the data modulator, adding the least significant bits bypassed from the input line, and supplying the modulated video data to the data lines. This data driver is understood to include both the data driver (element 300) and the data gray signal modifier (element 400) of figure 8. The data gray signal modifier adds the least significant bits bypassed from the input line (see rejection of claim 3), and the data driver supplies the modulated video data to the data lines. See paragraph [0009], which discloses "a data driver...outputting image signals" and "data lines...for transmitting the image signals". Here, the image signals are the modulated video data. The display apparatus disclosed by Lee differs from the claimed invention in that it lacks a timing controller supplying the video data to the input line and concurrently controlling the data driver and the gate driver.

In regard to claims 9-13, Lee discloses a liquid crystal display which is similar to that of the claimed invention (See the previous rejections of claims 1-7 and the previous paragraph regarding claim 8 for similarities.), except that it lacks a timing controller rearranging video data received from an input data and outputting RGB data and first and second timing signals, in which the data driver receives the first timing signal and the gate driver receives the second timing signal.

In regard to claims 8 and 9, Okuzuno discloses a display apparatus with a timing controller (see figure 1, element 8 and figure 9, element 107), which supplies video data to the input line (see DATA element of figures 1 and 9). The timing controller further controls the data driver (see element DCK of figures 1 and 9) and the gate driver (see element VCK of figures 1 and 9). Here the "source driver" is understood to be the data

driver. Also see paragraph [0051], in which Okuzuno describes the VCK and DCK clock signals and the function of the timing controller to ultimately “control the image display on the liquid crystal panel.” It is understood that the data outputted from the timing controller is RGB data because Okuzuno discloses in paragraph [0048] that the liquid crystal display may be provided with “a color filter for the three primary colors RGB”. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the display apparatus of Lee such that it would include the timing controller disclosed by Okuzuno. One would have been motivated to make such a modification in order to control the image display on the liquid crystal panel. Further, it is conventional and standard to include timing devices (e.g. clocks, etc.) to control data flow in a device.

12. In regard to claim 13, see rejections of claims 11 and 12.

Response to Arguments

13. Applicant's arguments filed 21 September 2004 have been fully considered but they are not persuasive.

14. Applicant argues, for example, on pages 1-2 that, “In Lee, the maximum value for the present gray level (G_n) is 255, and the maximum value for the previous gray level (G_{n-1}) is also 255...the maximum values of the modified gray level (G_n') in Lee are 255.” Applicant further concludes that “the maximum values of the modified gray level of Lee do not include values greater than the maximum gray level values of the delayed most significant bit data and the current most significant bit data. However, see the above rejection of claim 1. The delayed most significant bit data and the current most

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significant bit data are only 6-bit data, while the modified gray level of Lee is an 8-bit value.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laurel E LeFlore whose telephone number is (703) 305-8627. The examiner can normally be reached on Monday-Friday 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on (703) 305-4938. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LEL

LEL
11 January 2005


BIPIN SHALWALA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER